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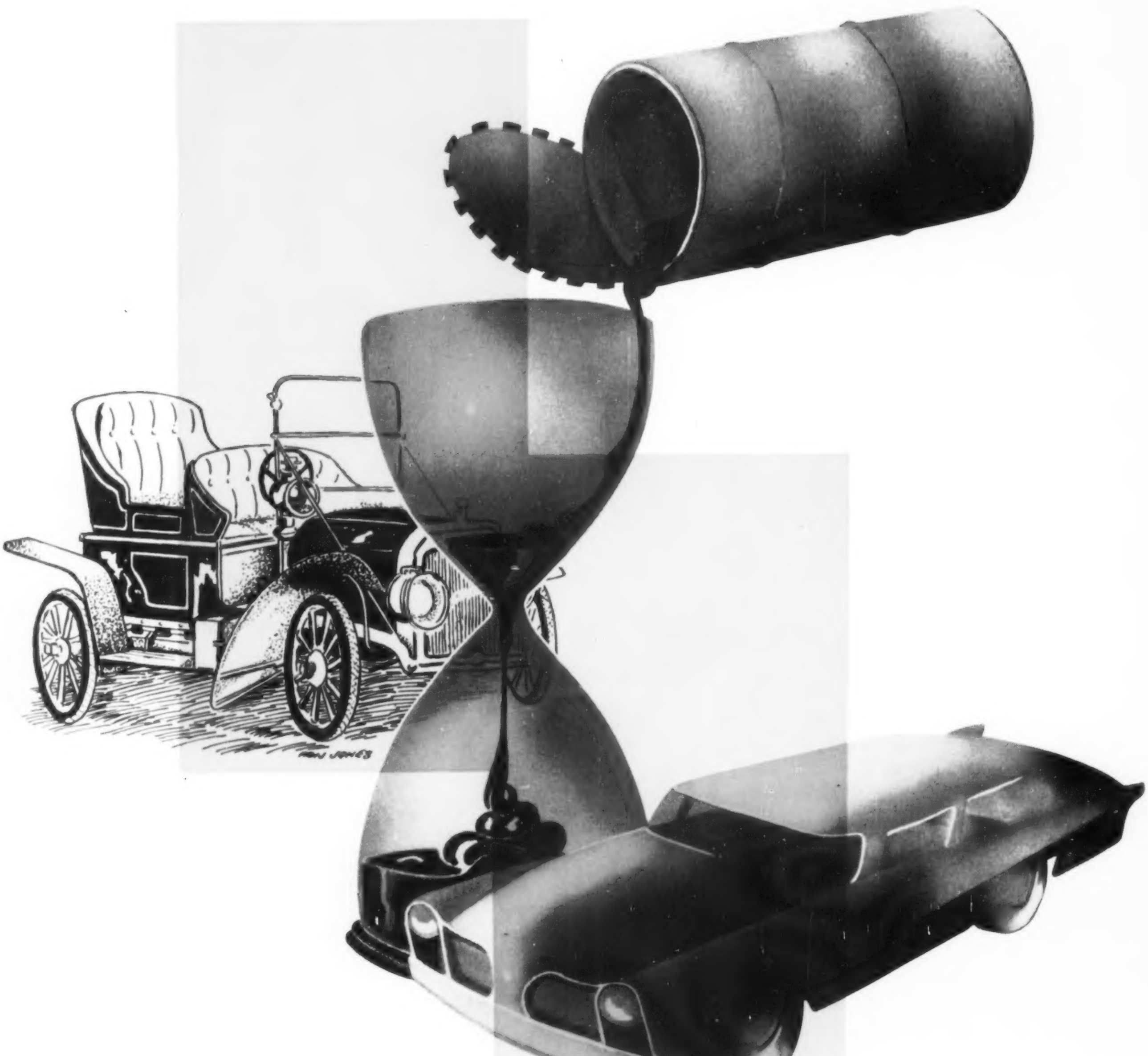
NLGI Spokesman

Journal of National Lubricating Grease Institute



President's page

by H. L. HEMMINGWAY, President, N L G I

Technical Activities of the Institute Are Not in Conflict with Other Organizations

From time to time someone questions whether technical activities of the Institute are in conflict with those of other organizations such as A.S.T.M., A.S.L.E., S.A.E. or others. The answer, of course, is that there is no conflict and our technical activities are designed to supplement rather than duplicate the activities of other organizations.

WHAT NLGI DOES

The National Lubricating Grease Institute is the only organization concerned solely with the problems of research, manufacturing, packaging, marketing, and application of lubricating greases. As such, it attempts to render technical service to its members. Over the years the Technical Committee, representing the Institute—or the lubricating grease industry—has conferred with other groups, such as the Anti-Friction Bearing Manufacturers, the American Association of Railroads, the manufacturers of lubricating grease dispensing equipment, and others.

TYPICAL ACTIVITIES

Typical of these activities was the work done some years ago in cooperation with the A.F.B.M.A. on a restudy of the scope and method of the Norma-Hoffman Bomb oxidation test for lubricating greases. Besides preventing extensive mis-application of the test, this work produced test data which were referred to the A.S.T.M. Their designation D942-50, "Oxidation Stability of Lubricating Greases by the Oxygen Bomb Method," which now clearly defines the scope and procedure for conducting the test, resulted from the N.L.G.I.—A.F.B.M.A. cooperative work.

Similarly, the extensive work done by the N.L.G.I. Technical Committee on viscosimeters for lubricating greases was furnished to the A.S.T.M. and now appears as A.S.T.M. Designation D1092-51, "Apparent Viscosity of Lubricating Greases."

CURRENT ACHIEVEMENTS

Currently, the Panel on the Delivery Characteristics of Dispensing Equipment for Lubricating Greases, which has developed a test method and solved a thorny problem for both industries, has issued a report which will be offered to some other organization, such as A.S.T.M., for possible publication. Likewise, members of the automotive industry and the S.A.E. are being made aware of the Recommended Practices for Lubricating Automotive Front Wheel Bearings for whatever use they may wish to make of it.

In short, the N.L.G.I. does not write specifications. It studies technical problems peculiar to the lubricating grease industry as presented by its membership. The data developed are freely offered to other groups, but it avoids conflict or duplication of the activities of other groups. This it does easily, because its Technical Committee is blessed with a gregarious membership which is also active in other technical groups working on similar problems.

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ABOUT THE COVER

This month we told artist Ronald Jones to illustrate our article RHEOLOGICAL STUDIES ON THE SYNERESIS OF GREASES on page eight. He feebly stumbled through the first sentence and a half, became glassy-eyed and indignantly wanted to know "How do you expect me to illustrate this"? We admitted we didn't know.

Thumbing through some old magazines we had lying around he came across a picture of a shiny new car that no one in his wildest dreams had ever thought of putting on a production line. "Now, here's something you ought 'ta have on your cover." We admitted it was a bit daring, but had possibilities.

What he finally came up with illustrates lubricating grease poured from a drum through an hour glass covering an old car and the latest thing. He explained the gimmick this way "The whole thing illustrates the use of lubricating grease over a span of years from the old to the latest." His idea turned out rather well, don't you think.

Hachiro Kageyama syneresis testing by the Herschel method

BUNNOSUKE YAMAGUCHI*

TAKASHI OKI†

HACHIRO KAGEYAMA‡

Rheological Studies on the Syneresis of Lubricating Greases

ALTHOUGH SYNERESIS has been observed since the time of Thomas Graham[1] with many kinds of organic and inorganic gels, the mechanism of this phenomenon has been considered by few investigators. Lloyd[2] regarded the syneresis of gelatine gel as a process provoked by the elastic force of the gel. Kuhn[3] considered this as a continuation of the disintegrative process of gelatinization through structure change and desolvation. Available evidence indicates that in duplex gels[4], such as soap-oil systems, one part of the oil is closely bound to the elementary soap micellae, the remainder being physically immobilized within the capillary spaces between the fibrillar network of soap. Although syneretic gels differ in the structure of the framework which is considered to be constructed by mutual linking or entangling of the more or less linear aggregates of the primary particles of the gelling agent, it is probable that at least some part of liquid is, in any case, held by capillary force within the spaces between the framework. Smith and his collaborators[5] regarded syneresis as a phenomenon in which mechanically-held liquid is expelled partly spontaneously and partly by structural changes in the gel framework. We consider that syneresis is due to creep in the viscoelastic body of gel, and, accordingly, some quantitative connection should exist between syneresis and creep. To substantiate this, it would be desirable to measure both the creep and syneresis of any gel and to examine the relationship between them, but it is unfortunately very difficult to determine the creep of a syneretic gel. As the creep behavior of viscoelastic bodies under constant stress can be represented by the theoretical equation of creep for the so-called generalized Voigt model, we determined in this investigation the syneresis-time curves under constant pressure of various greases, such as lithium soap greases, calcium soap greases, Bentone greases, silica greases and Silicone greases, and correlated the syneresis curves with the theoretical curves of creep. Since, even without load, the gravity corresponding to the static head acts on gel and because a gel has generally, as appreciated by Kuhn, more or less internal stress, it seems plausible that the creep due to such forces occurs in a gel and causes syneresis.

In our experiments, a Herschel press[6] was employed to determine the syneretic behavior of greases under constant pressure. The filter papers used for sandwiching the sample of greases were preoiled, as suggested by Herschel, because the true amount of exuded oil can not be determined without this operation. In the case of the Silicone grease, a light Silicone oil was used for preoiling the filter papers.

**Professor, Tokyo University*

†Research Assistant, Tokyo University

‡Chief of Laboratory, Kyodo Yushi Company

The results of measurements on Bentone grease B-2 and Silicone grease DC-33, compositions of which are given in Tables I and II, are illustrated respectively by o and x, in Figure 1, where the degree of syneresis (oil loss in weight per cent) is plotted against logarithmic time. The curves showing the relationship between syneresis and logarithmic time are S-shaped in both cases and coincide, as will be later described, almost completely in shape with the calculated curves of creep.

If we assume that the viscoelastic behavior of a gel can be represented by a generalized Voigt model, creep s under constant stress f_o is given by the equation[7]

$$S=f_o\int_{T=0}^{T=\infty} J(T)(1-e^{-t/T})dT \qquad (1),$$

where T is retardation time and J(T) is the distribution function of retardation times; J(T)dT represents the contribution to the elastic compliance (i.e., the reciprocal of the modulus) of the Voigt elements whose retardation times lie between T and T+dT.

To solve the equation, we used the following distribution of retardation times:

$$J(T)dT=(J_o/T)dT \qquad T_1<T<T_m$$
$$J(T)=0 \qquad T<T_1 \text{ and } T>T_m$$

where J_o is a constant, and T_1 and T_m are the minimum and maximum retardation times of the system. This distribution is quite similar to that of relaxation times which Andrews and his collaborators[8] applied to the calculation of Maxwellian decay of stress in polyisobutylene.

In terms of this distribution function, equation (1) becomes

$$S=f_o\left[\int_{T_1}^{T_m}(J_o/T)dT-\int_{T_1}^{T_m}(J_o/T)e^{-t/T}dT\right]$$

$$=f_oJ_o\left[\int_{T_1}^{T_m}d\ln T-\int_{T_1}^{T_m}(e^{-t/T}/T)dT\right]$$

$$=f_oJ_o\left[\ln\frac{T_m}{T_1}-\left\{E_i\left(-\frac{t}{T_1}\right)-E_i\left(-\frac{t}{T_m}\right)\right\}\right] \qquad (2),$$

where E_i denotes the exponential integral function; i.e.,

$$E_i(-X)=-\int_x^\infty \frac{e^{-y}}{y}dy \qquad (0<X<\infty).$$

If the values of T_1 and T_m are chosen to give the best fit to experimental data, $\frac{S}{f_oJ_o}$ can be calculated by equation (2).

Then, if we assume that syneresis in grease proceeds in direct proportion to creep, the oil loss due to the syneresis should be expressed by

$$L=\frac{ks}{f_oJ_o}=k\ln\frac{T_m}{T_1}-k\left[E_i\left(-\frac{t}{T_1}\right)-E_i\left(-\frac{t}{T_m}\right)\right] \qquad (3),$$

where L is oil loss in weight per cent and k is a proportional constant.

Putting $T_1=4$ minutes, $T_m=40$ minutes and $k=7.25$ for Bentone grease B-2 and $T_1=10$ minutes, $T_m=100$ minutes and $k=6.55$ for Silicone grease DC-33, we calculated the syneresis-time curves of these greases by equation (3). The calculated curves are compared with experimental syneresis data in Figure 1. They seem to correspond almost exactly with the experimental data. The theory that syneresis proceeds in proportion with creep is, therefore, correct, provided equation (2) is valid for grease.

The values of T_1 and T_m for each grease may vary according to the composition, as well as the phase state, of the grease. As T_1 is believed to belong to the most easily mobilizable molecules among the oil molecules

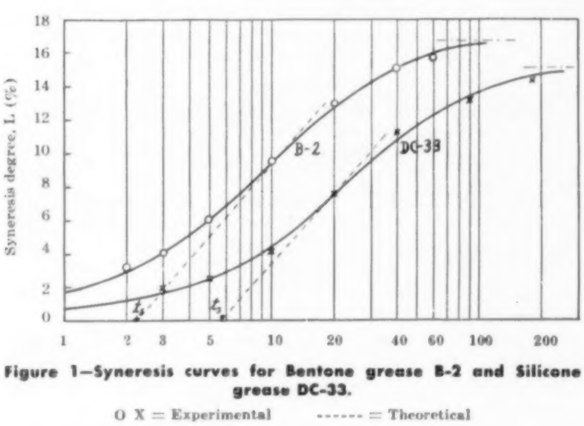

Figure 1—Syneresis curves for Bentone grease B-2 and Silicone grease DC-33.

O X = Experimental ------ = Theoretical

Shown here is Takashi Oki making the Herschel test.

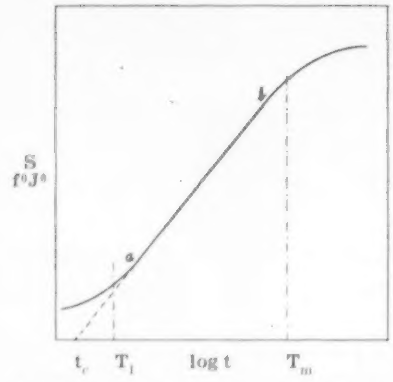

Figure 2—Type of creep curve having the straight line portion a b for 3 $T_1 < t << T_m$.

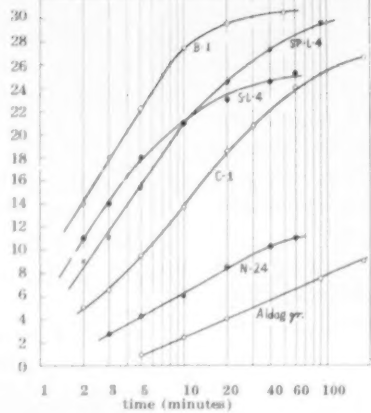

Figure 3—Synoresis curves of several greases.

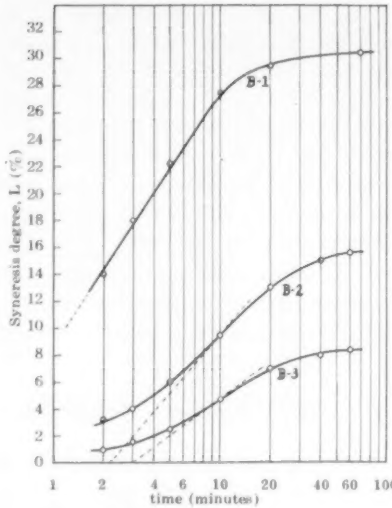

Figure 4—Syneresis curves of Bentone greases.

held mechanically within the framework of grease, the value of T_1 is generally very small ($T_1 < 30$ minutes in most cases), while T_m may in certain greases be several hundred times greater than T_1. Therefore, let us now consider equation (2) with the limitation $3\,T_1 < t < T_m$. The value of $-E_i(-\frac{t}{T_1})$ is 0.013 when $\frac{t}{T_1} = 3$, and 0.000004 when $\frac{t}{T_1} = 10$, thus decreasing rapidly with increase in $\frac{t}{T_1}$ until it becomes zero at the infinite value of $\frac{t}{T_1}$. Accordingly, if $t > 3T_1$, the term $E_i(-\frac{t}{T_1})$ in equation (2) can be neglected. Further, if $t << T_m$,

$$E_i\left(-\frac{t}{T_m}\right) = -\ln\frac{1}{V\frac{t}{T_m}} \quad [9]$$

where $V = 1.781$. Therefore, when $3T_1 < t << T_m$, the equation (2) reduces to the form

$$\frac{S}{f_oJ_o} = 2.303\left(\log\frac{V}{T_1} + \log t\right) \qquad (4),$$

indicating that a straight line relationship holds between $\frac{S}{f_oJ_o}$ and logarithmic time. However, if t approaches T_m or becomes larger than T_m, or if t approaches T_1 or becomes smaller than T_1, the relation between $\frac{S}{f_oJ_o}$ and logarithmic time is no longer linear, but is represented by a type of curve having the straight line portion for $3T_1 < t << T_m$ similar to that illustrated in Figure 2. In support of the theory that syneresis is due to creep, syneresis curves which correspond to a creep curve or a portion of the curve have frequently been observed, as shown in Figures 3-6, where the syneresis curves for various greases, such as Bentone grease, Silicone grease, lithium soap grease, sodium soap grease, calcium soap grease and Aldag grease, are plotted. The characteristics of these greases are given in Tables I-IV.

In the case of the creep curve shown in Figure 2, the time t_c which is given by the intercept of the extrapolated straight line portion of the curve on the log time axis corresponds in equation (4) to the value of t for $\frac{S}{f_oJ_o} = 0$.

TABLE II

Characteristics of Bentone Greases Tested

Grease	Composition: Mineral Oil* (%)	Composition: Bentone 34 (%)	A.S.T.M. Worked Penetration	Syneresis Index ($1/t_s$)
B-1	90	10	381	$\frac{1}{0.4} = 2.5$
B-2	86	14	226	$\frac{1}{2.2} = 0.45$
B-3	82	18	188	$\frac{1}{3.0} = 0.33$

*The viscosity of the mineral oil is 7.37 centistokes at 50°C.

TABLE I

Characteristics of Commercial Greases Tested

Type of Soap	Constituents: Oil	Constituents: Thickener	A.S.T.M. Worked Penetration	Syneresis Index ($1/t_s$)
Silicone grease DC-33	silicone oil	Li soap	218	$\frac{1}{5.7} = 0.18$
Sodium soap grease N-24	mineral oil	Na soap	227	$\frac{1}{1.0} = 1.0$
Aldag grease No. 300	mineral oil	alumina-silica gel	220	$\frac{1}{3.4} = 0.29$
Calcium soap grease C-1	mineral oil	Ca soap	227	$\frac{1}{1.7} = 0.59$

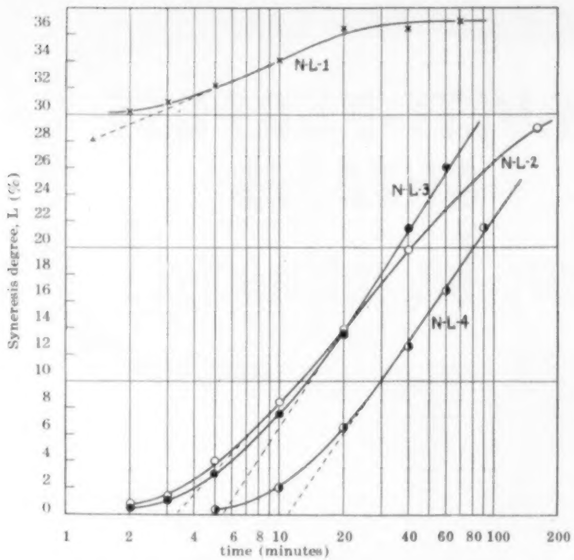

Figure 5—Syneresis curves of lithium soap greases.

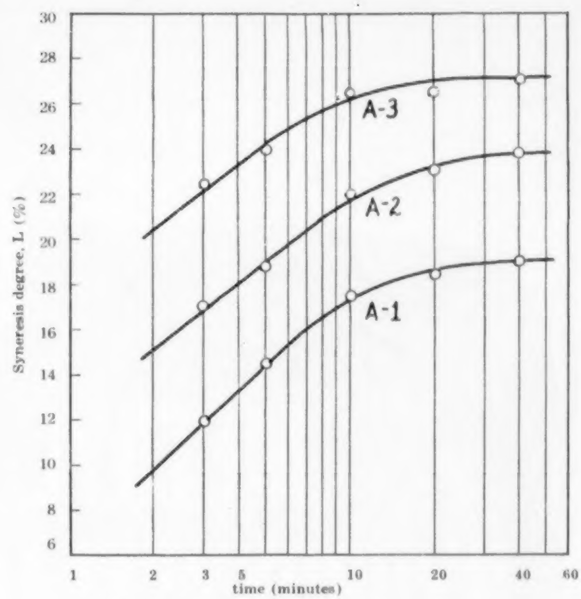

Figure 6—Syneresis curves of silica greases.

Therefore

$$t_e = \frac{T_1}{V} = \frac{T_1}{1.781}.$$

As t_e is proportional to T_1, the value of t_e should be intimately connected with the initial rate of syneresis and may be a measure of the rate. When the creep curve resembles the syneresis curves in Figure 1, the value of t_e can also be approximately determined by the intercept on the log time axis of the tangent line drawn to the curve at the inflexion point.

Since the syneresis curve is similar in shape to the creep curve, the time t_s which corresponds to t_e for the creep curve is obtainable from the syneresis curve in the same manner as above, and the value of t_s, like that of t_e, may be a relative measure of the initial rate of syneresis. We designated the reciprocal of t_s as the "syneresis index," and proposed to evaluate the initial rate of syneresis by this index. As has been pointed out by Farrington and Humphreys,[10] the bleeding of grease in storage seems to be mainly connected with the initial rate of syneresis in the Herschel test. The syneresis index may, therefore, be applicable as a practical measure of the bleeding rate of grease in storage. In Tables II-IV, the values of syneresis index of various samples of Bentone greases, lithium soap greases and silica greases are shown together with their values of A.S.T.M. penetration. These values of syneresis index were determined from the syneresis curves of the greases shown in Figures 3-6. For greases made with the same thickening agent, a straight line relationship holds, as is illustrated by Figure 7, between A.S.T.M. penetration and the logarithmic value of the syneresis index. The relation for calcium soap greases in Figure 7 was obtained from the experimental data of Farrington and Humphreys.

TABLE III

Characteristics of Lithium Soap Greases Tested

Grease	*Base Oil*	*Viscosity of Base Oil at 50°C. (c.s.)*	*Li Soap* (%)*	*A.S.T.M. Worked Penetration*	*Syneresis Index ($1/t_s$)*	*Ultimate Oil Loss (%)*
N-L-1	60 spindle oil	7.26	15	426	$\frac{1}{0.5\times10^{-4}} = 2\times10^4$	...
N-L-2	120 machine oil	37.3	15	231	$\frac{1}{3.3} = 0.33$	...
N-L-3	250 diesel oil	54.2	15	228	$\frac{1}{5.5} = 0.18$	...
N-L-4	30 motor oil	70.0	15	223	$\frac{1}{11.0} = 0.091$	...
S-L-4	squalane	12.9	17	261	$\frac{1}{0.6} = 1.67$	26.1
SP-L-4	squalane + 3% polyisobutene	24.4	17	246	$\frac{1}{0.8} = 1.25$	28.2

*Lithium soap of hydrogenated castor oil acid.

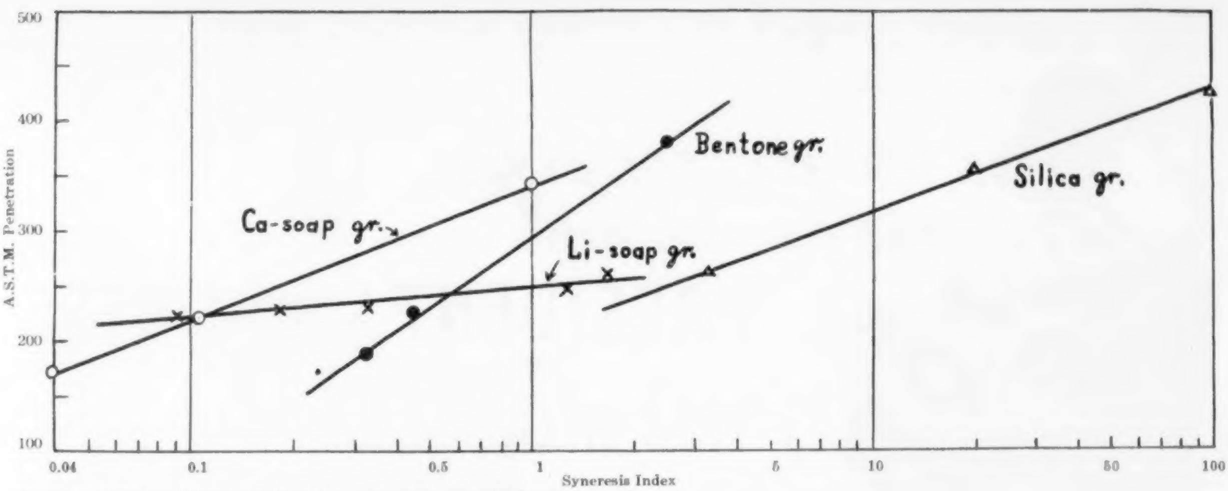

Figure 7—Relation between A.S.T.M. penetration and the logarithmic value of syneresis index.

To express the relation between oil loss L and time t in the Herschel tests, Farrington and Humphreys used the empirical formula

$$\frac{t}{L} = a + bt$$

where a and b are constants. They found, however, that this formula was not in agreement with the experimental results during the initial period of syneresis and considered that this discrepancy was probably due to the time required to wet the filter papers, because their tests were made with non-preoiled filter papers. But our tests made with preoiled filter papers have shown also that no straight line relationship holds between $\frac{t}{L}$ and t during the initial period of syneresis, as is illustrated by the result on grease N-L-4 in Figure 8. The conclusion of Farrington and Humphreys that a in the above formula is a measure of the initial rate of syneresis may therefore be untenable. Ultimate oil loss L_{ult}, obtainable through the relation $L_{ult} = \frac{1}{b}$, does not always increase with the increase of A.S.T.M. penetration, even for greases of the same soap base. Grease S-L-4 is, as shown in Table III, higher in ultimate oil loss than grease SP-L-4, while the former is lower in A.S.T.M. penetration than the latter. Thus, for greases thickened with the same gelling agent, no such definite relationship exists between ultimate oil loss and A.S.T.M. penetration as that found between syneresis index and A.S.T.M. penetration.

TABLE IV

Characteristics of Silica Greases Tested

Grease	*Composition*		*A.S.T.M. Worked Penetration*	*Syneresis Index* $(1/t_s)$
	Mineral Oil (%)*	*Silica Aerogel (%)*		
A-1	92	8	425	$\frac{1}{0.01} = 100$
A-2	91	9	356	$\frac{1}{0.05} = 20$
A-3	90	10	263	$\frac{1}{0.30} = 3.3$

*The viscosity of the mineral oil is 70.0 centistokes at 50°C.

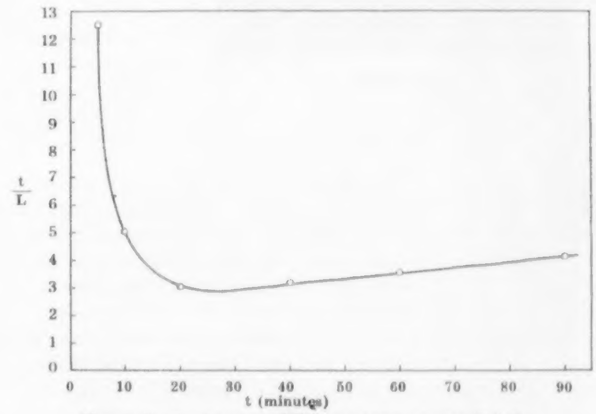

Figure 8— $\frac{t}{L}$ **—t curve of lithium soap grease N-L-4.**

Conclusion

In support of the theory that syneresis is due to creep, the syneresis curves of lubricating greases can be accurately expressed by the theoretical equation of creep for the generalized Voigt model. The syneresis index obtainable from the syneresis curve is a measure of the initial rate of syneresis. For greases thickened with the same gelling agent, a straight line relationship holds between A.S.T.M. penetration and the logarithmic value of syneresis index, and no definite connection exists between ultimate oil loss and A.S.T.M. penetration.

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G. A. OLSEN

Excerpts from . . .

PRESIDENT'S ADDRESS

1954 NLGI Annual Meeting

It is my privilege and a genuine pleasure to welcome you to this 22nd Annual Meeting of the National Lubricating Grease Institute here in San Francisco which Western City, incidentally, is being honored for the first time by the Institute in this manner.

The National Lubricating Grease Institute is an unusual living example of business democracy in action, with the largest and the smallest segments of our industry working side by side in perfect harmony contributing from their "know how" and experience, not only for the advancement of our industry but, in a much larger degree, for the benefit of our common friend, Mr. Consumer.

This Institute was originally conceived by two men, Mr. J. R. Battenfeld and Mr. William H. Saunders, Jr., who in 1932 wrote letters to each other that crossed in the mail suggesting the creation of some type of organization for the Lubricating Grease Industry. Mr. Battenfeld, who was the Institute's first President, has passed on to his reward. Mr. Saunders, who was the third President of the Institute, is presently a member of its Board of Directors.

The same objectives and purposes which were wisely adopted by the first general Institute meeting in 1933 still prevail and speak most nobly for the farsightedness of its creators.

It has been a real privilege as well as a genuine pleasure to act as your President during this past year. No one has ever experienced a greater degree of cooperation and helpfulness than it has been my privilege to enjoy, and I want to take this opportunity to express my sincere appreciation to every Board Member, every Officer, every Committee Chairman and every Committee member for their untiring efforts—without which there would be no Institute. I also wish to say thank you to our Executive Secretary, Mr. Harry Bennetts, and our office staff for their willing and faithful cooperation.

In attempting to peer into the future, it is of little use to base our opinions on what has happened in the past or the few years since the Lubricating Grease Industry has developed to where we know it today.

Our population is steadily increasing, bringing continued demands for speedier and more efficient distribution and transportation of the products from our farms and our factories, which between now and the turn of the century will undoubtedly necessitate new modes of transportation, together with the associated lubrication problems for our Industry to solve.

In this country today, the greatest percentage of petroleum and its products move via pipe lines and coal has been moving via pipe lines in limited quantities in recent years.

Let's turn from the realities of today to the fantasy of the future and picture in your mind, if you will, this country's major centers of distribution being inter-connected by a system of freight pipe lines of six to eight feet in diameter, through which capsules or containers filled with thousands of pounds of merchandise or mail will travel at speeds of 250 or 350 miles per hour, switching out automatically at their proper destinations. While such a mode of transportation will evade many of the problems encountered today, such as snow, rain, wind, and dust, in order to function smoothly it will unquestionably require huge quantities of lubricating grease, with the resulting problems which will keep many a research chemist and engineer burning the midnight oil.

Again looking into the fantasy of the future, might it not be possible that lubricating grease might some day perform a very important function towards the eventual realization of world peace?

Some few of you know the problem of lubrication encountered by our Military Scientists as they worked to develop and perfect our rockets with their intricate and

delicate mechanisms, which measure altitude, speed, temperature, and so forth, and in turn automatically forward that information to the control station.

Picture, if you will in your mind, giant Flying Platforms fueled by captive atomic power and capable of remaining aloft at extreme altitudes for indefinite periods, equipped with undreamed of facilities for generating a new type of neutralizing ray, undetectable by radar or the human eye, but possessed of unusual penetrating power capable of thoroughly immobilizing all metal coming within its path by making such metal incapable of functioning as a generator or conductor of electric energy.

While humans would not be directly affected, you can well recognize the demoralizing effect this would have on both the civilian and military personnel of any aggressor nation, when they suddenly found that their principal industrial centers, communication and transportation facilities, ships, planes, etc., have ceased to function due to this new phenomenon which has deprived them of what is today so essential, namely, electric energy.

Multiply the lubricating problems which we know were encountered at the rocket proving grounds, where the time factor was only one of minutes, compared with the many days of continuous flight these Neutralizing Platforms might be required to remain aloft. Then think of how vital it would be that these man-made satellites continue in flight without mishap and you face another fantastic future contribution which the Lubricating Grease Industry may some day be called upon to make in behalf of world peace and for the eventual benefit of all mankind.

While these ideas may today seem fantastic, they may very easily become realities in the near future.

Accordingly, it behooves each of us to keep on our toes and remain constantly cognizant that the only thing that does not change is change itself.

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The Spokesman

Is

YOUR

Magazine

LUBRICATING GREASE CHEMIST WANTED

Long established manufacturer of specialty greases in New York area has opening for competent man to act as assistant to superintendent and handle laboratory control and research work.

Must have adequate experience and knowledge of latest type greases and inhibitors to meet specification requirements of machinery builders, steel mills, bearing manufacturers, etc., with ability to closely control production uniformity.

Give full particulars of past training and experience, including age and marital status; send photo, and state salary expectations. Address reply to NLGI SPOKESMAN, Box No. 211.

Patents and Developments

Silicone Greases

Although silicones seem to have physical properties possessed by the best mineral oils, they are not, in general, usable for purposes of lubrication because in many cases they do not protect the lubricated surfaces from corrosion and, in addition, frequently they simply do not lubricate sliding contacting metal surfaces. So says George M. Hain and William A. Zisman, in their U. S. Patent 2,693,449. For example, they cite dimethyl silicone polymer which has a viscosity of about 70 centistokes at 25° C., and said to be one of the most common fluids corresponding to the formula:

$$R\left[-\underset{R_2}{\overset{R_1}{\underset{|}{\overset{|}{Si}}}}-O\right]_n-\underset{R_4}{\overset{R_3}{\underset{|}{\overset{|}{Si}}}}-R_5$$

It is claimed to have no inherent rust inhibiting value, such as that possessed by many hydrocarbon oils, and it is not a good boundary lubricant because seizure at low loads will occur in bearings employing it as a lubricant.

The patent is directed to the production of silicone greases having high oxidation resistance. Lubricating compositions containing an organo-silicon base fluid and a minor amount (5-30%) of lithium stearate, together with 0.2-3% of phenothiazine, possess a remarkable resistance to oxidation which is claimed to be entirely disproportionate to what would be expected from the known properties of the individual ingredients.

To illustrate this property, oxidation tests were run in a Norma-Hoffman bomb on 20 gm. samples subjected to an initial pressure of 110 psi and held constantly at 150° C. Composition "A" consisted of 83% methylphenyl silicone co-polymer and 17% lithium stearate, while composition "C" consisted of 82% methyl phenyl silicone copolymer, 17% lithium stearate and 1% phenothiazine. Table 1 shows the pressure drop obtained with the two compositions at various intervals of time.

Table I

	Pressure Drop in p.s.i.	
Time, hrs.	*A*	*C*
0	0.0	0.0
20	4.0	0.0
40	13.0	0.0
60	24.0	0.0
80	33.0	0.0
100	41.0	1.0
120	46.0	1.0
140	50.0	1.0
160	...	4.0
180	...	6.0
200	...	8.5
220	...	9.0
240	...	10.5
260	...	12.5
280	...	13.5
300	...	13.5
400	...	16.0
500	...	21.5
525	...	22.5

It is apparent from the data that the mixture without phenothiazine showed a pressure drop of 50 psi in 140 hours, whereas, during that period the phenothiazine-inhibited grease exhibited a drop of only 1 psi. In fact, even at the end of 525 hours, the pressure drop of the inhibited mixture was only 22.5 psi.

News Items

There is now a trend toward colored greases (*Wall St. J.* 11-1-54, p. 1).

Standard Oil (Calif.) is packaging its new RPM grease in plastic bags shaped like extra-long toothpaste tubes, holding 12 ozs. The top is cut off and the whole thing is dropped into the gun, thus avoiding messiness (*Wall St. J.* 11-1-54, p. 1).

American Potash and Chem. Co. will build, near San Antonio, a plant for producing lithium chemicals (*N.Y. World Teleg.* 10-19-54, p. 35).

As an additive for black grease (for lubricating water-cooled plate mill bearings by the Tecalemit system), a soft stable lime soap product made of heavy black oil and fortified with lead oleate or lead naphthenate was suggested (*Sci. Lubrication*, 6-54, p. 36).

Factors affecting performance of high temperature greases-Armstrong (*Iron and Steel Engr.* 9-54, p. 167).

NLGI Associate and Technical Mem

CONTAINER AND CLOSURE MANUFACTURERS

Bennett Industries, Inc.
Peotone, Illinois
Representative—S. A. Bennett

Central Can Company
2415 West 19th St., Chicago 8, Illinois
Representative—Henry Frazin

Continental Can Company, Inc.
629 First National Bank Bldg., Omaha, Neb.
Representative—T. A. Graham

Geuder, Paeschke & Frey Company
324 North Fifteenth St., Milwaukee 1, Wis.
Representative—Neil Savee

Inland Steel Container Company
6532 South Menard Ave., Chicago 38, Ill.
Representative—Robert J. Greenebaum

Jones & Laughlin Steel Corporation
Container Division
405 Lexington Ave., New York 17, N. Y.
Representative—Jerry Lyons

National Steel Container Corp.
6700 South LeClaire Ave., Chicago 38, Ill.
Representative—Henry Rudy

The Ohio Corrugating Company
917 Roanoke Ave. S. E., Warren, Ohio
Representative—Lawrence F. McKay

Rheem Manufacturing Company
477 Madison Ave., New York 22, New York
Representative—F. J. Blume

Rieke Metal Products Corporation
Auburn, Indiana
Representative—Mahlon E. Rieke

Trilla Cooperage, Inc.
2524 Blue Island Ave., Chicago 8, Ill.
Representative—Lester Trilla

United States Steel Products
Division, United States Steel Company
30 Rockefeller Plaza, New York 20, N. Y.
Representative—Wm. I. Hanrahan

Vulcan Stamping & Mfg. Co.
P. O. Box 161, Bellwood, Illinois
Representative—H. B. Scharbach

MANUFACTURERS OF EQUIPMENT FOR APPLICATION OF LUBRICATING GREASES

Aro Equipment Corporation
Bryan, Ohio
Representative—R. W. Morrison

Balcrank, Inc.
Disney near Marburg, Cincinnati 9, Ohio
Representative—Richard P. Field

Gray Company, Inc.
60 Northeast 11th Ave., Minneapolis 13, Minn.
Representative—B. A. Beaver

Lincoln Engineering Company
5701 Natural Bridge Ave., St. Louis 20, Mo.
Representative—G. A. Hubbard

Stewart-Warner Corporation
Alemite Division
1826 Diversey Parkway, Chicago 14, Illinois
Representative—D. C. Peterson

United States Air Compressor Co.
5300 Harvard Ave., Cleveland 5, Ohio
Representative—C. A. Bening

MARKETING ORGANIZATIONS

California Texas Oil Company, Ltd.
551 Fifth Ave., New York 17, New York
Representative—Hal U. Fisher

Canadian Petrofina Limited
1015 Beaver Hall Hill
Montreal, Quebec, Canada
Representative—M. E. Wight

REFINERS

Farmers Union Central Exch., Inc.
P. O. Box G, St. Paul 1, Minnesota
Representative—H. F. Wagner

Mid-Continent Petroleum Corp.
Mid-Continent Bldg., P. O. Box 381, Tulsa, Okla.
Representative—J. W. Basore

Valvoline Oil Company
Division of Ashland Oil & Refining Co. Box G
Freedom, Pennsylvania
Representative—D. A. Smith

SUPPLIERS OF EQUIPMENT FOR MANUFACTURING LUBRICATING GREASES

Blaw-Knox Company
Buflovak Equipment Division
1543 Fillmore Ave., Buffalo 11, New York
Representative—Edward V. Hegg

Chemicolloid Laboratories, Inc.
30 Church St., New York 7, New York
Representative—David F. O'Keefe

The Girdler Company
A Div. of National Cylinder Gas Co. Box 987
Louisville 1, Kentucky
Representative—J. E. Slaughter, Jr.

Manton-Gaulin Mfg. Co., Inc.
44 Garden Street
Everett 49, Massachusetts
Representative—G. W. Eldridge

Morehouse Industries
707 Henry Grady Building, Atlanta 3, Georgia
Representative—George E. Missbach

The C. W. Nofsinger Company
906 Grand Ave., Kansas City 6, Missouri
Representative—C. W. Nofsinger

Stratford Engineering Corporation
1414 Dierks Bldg., Kansas City 6, Missouri
Representative—D. H. Putney

SUPPLIERS OF MATERIALS FOR MANUFACTURING LUBRICATING GREASES

Acme-Hardesty Company
60 East 42nd St., New York 17, New York

American Cyanamid Company
30 Rockefeller Plaza
New York 20, New York
Representative—R. B. Wainright

Archer-Daniels-Midland Company
Chemical Products Division, 2191 W. 110th St.
Cleveland 2, Ohio
Representative—Frank C. Haas

Armour & Co., Chemical Division
1355 West 31st St., Chicago 9, Illinois
Representative—H. F. Whitler

The Baker Castor Oil Company
120 Broadway, New York 5, New York
Representative—H. H. Fritts

Darling & Company
4201 South Ashland Ave., Chicago 9, Illinois
Representative—G. W. Trainor

E. I. du Pont de Nemours & Co.
Wilmington, Delaware
Representative—John R. Sabina

The Elco Lubricant Corporation
Jennings Road & Denison Avenue
Cleveland 9, Ohio
Representative—Frank X. Sieloff

Emery Industries, Inc.
4300 Carew Tower, Cincinnati 8, Ohio
Representative—R. F. Brown

Enjay Company, Inc.
15 West 51st St., New York 19, New York
Representative—Sidney W. Fay

Foote Mineral Company
18 W. Chelten Ave., Philadelphia 44, Penn.
Representative—W. F. Luckenbach

General Mills, Inc.
Chemical Division, 400 Second Ave. South
Minneapolis 1, Minnesota
Representative—Abner C. Hopkins, Jr.

A. Gross and Company
295 Madison Avenue, New York 17, N. Y.
Representative—Eugene W. Adams

W. C. Hardesty Company, Inc.
P. O. Drawer 110, Dover, Ohio
Representative—W. G. McLeod

Harshaw Chemical Company
1945 East 97th Street, Cleveland 6, Ohio
Representative—W. J. Straka

Leffingwell Chemical Company
P. O. Box 191, Whittier, California
Representative—D. E. Murphy

Lithium Corporation of America, Inc.
Rand Tower, Minneapolis 2, Minnesota
Representative—Walter M. Fenton

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The Lubrizol Corporation
Box 3057—Euclid Station, Cleveland 17, Ohio
Representative—John H. Baird

Mallinckrodt Chemical Works
2nd & Mallinckrodt Sts., St. Louis 7, Missouri
Representative—C. E. Cosby

N. I. Malmstrom & Company
147 Lombardy St., Brooklyn 22, New York
Representative—Ivar Wm. Malmstrom

Metasap Chemical Corporation
Harrison, New Jersey
Representative—O. E. Lohrke

Minerals & Chemicals Corporation of America
210 W. Washington Sq., Philadelphia 5, Penn.
Representative—R. H. Hubbell, Jr.

Monsanto Chemical Company
1700 Second Street, St. Louis 4, Missouri
Representative—J. W. Newcombe

National Lead Company
Baroid Sales Div., 111 Broadway, N. Y. 5, N. Y.
Representative—H. H. Farnham

National Rosin Oil Products, Inc.
1270 Ave. of the Americas, N. Y. City 20, N. Y.
Representative—Richard Bender

Newridge Chemical Company
7025 West 66th Place, Chicago 38, Illinois
Representative—T. E. Shine

M. W. Parsons—Plymouth, Inc.
59 Beekman St., New York City 38, New York
Representative—Herbert Bye

Synthetic Products Company
1636 Wayside Rd., Cleveland 12, Ohio
Representative—Garry B. Curtiss

Swift & Company
165th & Indianapolis Blvd., Hammond, Ind.
Representative—F. H. Beneker

Vegetable Oil Products Co., Inc.
Vopcolene Division
5568 East 61st Street, Los Angeles 22, Calif.
Representative—C. F. Williams

Warwick Chemical Company
Division Sun Chemical Corp., 10-10 44th Ave.
Long Island City 1, New York
Representative—Dr. J. J. Whitfield

Witco Chemical Company
75 East Wacker Drive, Chicago 1, Illinois
Representative—E. F. Wagner

TECHNICAL AND RESEARCH ORGANIZATIONS

Institut Francais du Petrole
CMrR—Courtel, 4 Place Bir Hackeim
Rueil—Malmaison (S. et Oise) France

Les Laboratoires de Recherches Purfina
31 rue de la Loi, Bruxelles, Belgium
Representative—R. Gillerot

Midwest Research Institute
4049 Pennsylvania, Kansas City 2, Missouri
Representative—Dr. M. H. Thornton

Petroleum Educational Institute
9020 Melrose Avenue, Los Angeles 46, Calif.
Representative—G. A. Zamboni

Phoenix Chemical Laboratory, Inc.
3953 W. Shakespeare Ave., Chicago 47, Ill.
Representative—Mrs. G. A. Krawetz

Sociedad Nacional de Petroleos
Rua D. Pedro V, no. 80, Lisbon, Portugal
Representative—Manuel Corda Boullosa

PEOPLE in the Industry

Production Reorganization Announced by Shell Oil

A reorganization of Shell Oil Company's mechanical engineering department for exploration and production into separate gas, technological and mechanical engineering departments has been announced by A. J. Galloway, vice president in charge of exploration and production.

Mr. Galloway said the new organization is a reflection of the increasing importance of Shell's gas activities and of the greater attention being given to technological advances and to new problems such as those concerning tar sands and oil shales.

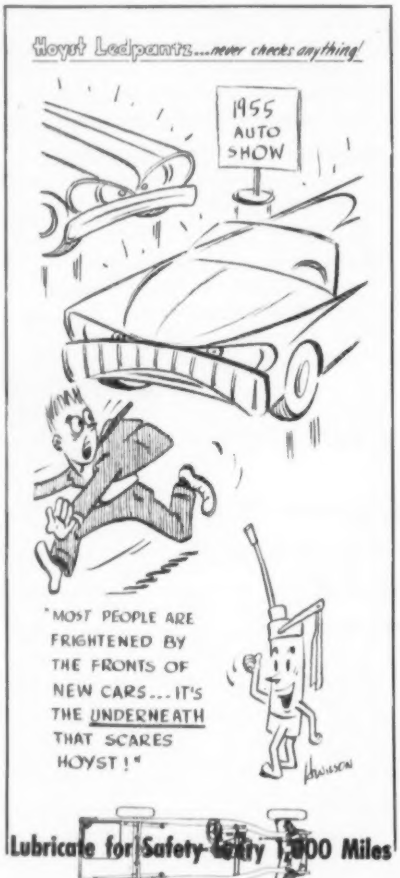
Managers of the three new departments will report to R. W. Bond, production manager.

W. B. Golush, formerly head office gas representative, will be manager of the gas department with over-all responsibility for coordination of the company's gas activities. J. T. Jordan, formerly chief technologist in New York, will be manager of the technological department, dealing with oil and gas technology, and with tar sands, "in situ" combustion, and other special studies. J. D. Goodrich, formerly production manager of the North Texas division of the Tulsa area, will be manager of the mechanical engineering department, responsible for coordination of mechanical engineering work in the company's various production areas.

Mr. Golush was born at Bayonne, New Jersey, and received a degree in chemical engineering from the Carnegie Institute of Technology at Pittsburgh. He joined Shell as a chemical engineer in the manufacturing department at Martinez, California, in 1935. He was appointed technological assistant at San Francisco in 1938 and executive assistant in 1943. Three years later he was named assistant department manager at Dominguez, California, and in 1947 became senior engineer at Houston, Texas. The following year he was made manager of the gas-gasoline department. He became head office gas representative in 1952.

Mr. Jordan was born at Muskogee, Oklahoma, and received a degree in refinery engineering from the University of Oklahoma at Norman. He joined Shell as a roustabout at Lucien, Oklahoma, in 1936. He was transferred to Houston in 1940 as a process engineer and was appointed chief technologist there in 1948. Four years later he became senior mechanical engineer at New York. In 1954, he was appointed chief technologist.

Mr. Goodrich was born at Oklahoma City and received a degree in mechanical engineering from Rice Institute at Houston. He joined Shell as a mechanical engineer at Midland, Texas, in 1937. He was appointed division mechanical engineer at Lake Charles, Louisiana, in 1940 and became chief mechanical engineer there in 1946. He was appointed chief mechanical engineer at Tulsa, Oklahoma, in 1950, and production manager of the North Texas division in 1953.



John D. Rogers To Du Pont

John D. Rogers will serve as engineer on new product developments for the Du Pont Company's Petroleum Chemicals Division, it has been announced by J. R. Sabina, technical manager of the division.

Mr. Rogers formerly worked with refiners on automotive combustion problems as an automotive technologist. He joined the Du Pont Company in 1951 as a senior engineer at the Petroleum Laboratory at Deepwater Point, New Jersey.

Before coming with Du Pont, he was engaged in fuel development work for the Standard Oil Company of California where he specialized in rocket and jet aviation fuels. Previous to this, he was employed by Wright Aeronautical Corporation as a combustion analyst and design engineer.

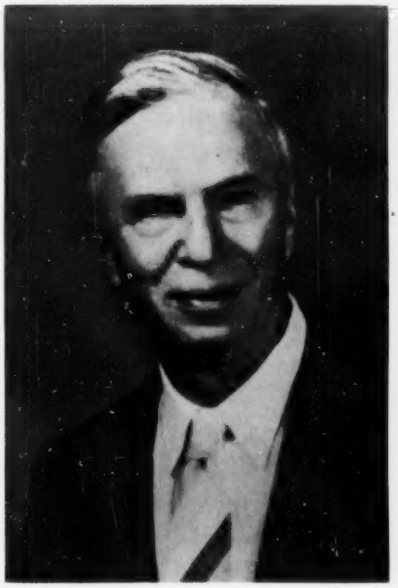
A graduate of the University of Delaware, Mr. Rogers received his master's degree in mechanical engineering at Stevens Institute of Technology and did advance study in thermodynamics at the University of California at Berkeley.

Acheson Announces Personnel Promotions

Howard A. Acheson, president of Acheson Industries, Inc., announced that M. W. Reynolds has been appointed general manager of Acheson Colloids Company, and that P. C. Buck has been named to take charge of engineering and production for Acheson Industries, Inc. Both are vice presidents of Acheson Industries, Inc., of which Acheson Colloids Company, Port Huron, Michigan, manufacturers of colloidal graphite, is a division.

Mr. Reynolds will have full responsibility for the Port Huron operation, formerly shared by Mr. Buck. Mr. Buck's position is a new one, growing out of the firm's recent expansion.

Mr. Buck is currently in Orange, Texas, supervising construction of a new pigment dispersing plant, for Acheson Dispersed Pigments Co., Philadelphia, Pa. He will return to Port Huron to carry on his new duties.

Pictured from left to right are G. C. Bradshaw, Walter S. Keutzer, and Warren F. Michener of Mallinckrodt Chemical Works. Joseph Fistere, President, recently announced their promotions in the sales department. Mr. Bradshaw is the new director of sales research. Mr. Keytzer is western division sales manager and Mr. Michener is assistant sales manager.

F. M. Siebert Dies In Houston

Frank M. Siebert, better known in the oil industry as "Doc" Siebert, for many years Chief Chemist for Gulf Oil's Houston Production Division, died in Houston, Texas recently. He had been retired from the company for two years.

A native of Somerset County, Pennsylvania, Dr. Siebert was graduated from Penn State College in 1910 with a degree in Chemical engineering, and received his Ph.D. from Princeton in 1914. He came with Gulf in 1917 after four years with the U.S. Bureau of Mines.

At the Bureau of Mines he and his collaborators were the first to separate petroleum gas into its component hydrocarbons.

Originally assigned by Gulf to the study of pipe line corrosion, Dr. Siebert became interested in oil and gas conservation. It is through his work in these fields that he was recognized throughout the industry as one of the pioneers in conservation.

One of Dr. Siebert's early significant accomplishments was that of developing a method of separating oil from an oil and water emulsion. He developed an electrical dehydration system which, combined with the use of centrifugal force, proved much more efficient than methods theretofore used.

He pioneered in the development of drilling methods and in the use of many other devices now accepted as routine conservation procedure.

Dr. Siebert and his associates started a mud school in the Gulf Laboratory in Houston, delving into all phases of the use of mud for drilling purposes. Engineers trained in that school are now scattered all over the world employed as specialists in mud drilling techniques.

He was a member of the American Chemical Society and many other technical societies and was active in these societies throughout his career with Gulf.

Cambere Moves to Stewart-Warner

Ara A. Cambere, formerly vice president and director of the Oliver Iron and Steel Corporation, Pittsburgh, has been named assistant to Bennett Archambault, president of Stewart-Warner Corporation.

Mr. Cambere will be responsible for the activities of Stewart-Warner Corporation in connection with its program of diversification and expansion by the acquisition from others of new products and businesses.

Mr. Cambere was at one time associated with Hayden, Stone & Co., New York investment bankers, and was later vice president of Manufacturers Capital Corp., New York, as well as director of several other corporations. He was president of Berry Motors, Inc., Corinth, Miss., before its acquisition in 1951 by the Oliver Iron and Steel Corporation.

A native of New York, Mr. Cambere is a graduate of the Wharton School of Finance, University of Pennsylvania. He is a member of the Duquesne Club and the St. Clair Country Club, both of Pittsburgh, and the Lawyers' Club and Seventh Regiment Association of New York.

Witco-Continental Advances Carver

Announcement is made of the appointment of Leslie D. Carver as Export Technical Sales Manager for Witco Chemical Co., and Continental Carbon Co.

Mr. Carver has been Technical Service Director, Rubber Chemicals Division, since joining the Witco-Continental organization in January 1948. In this capacity he has represented the organization in the United Kingdom and Europe, traveling also and becoming well known in the United States, Canada, and Mexico.

NEW OWNER AND MANAGER OF COWLES DISSOLVER

G. H. MOREHOUSE

HORTON N. MEYER, JR.

G. H. Morehouse and L. P. Smoot, owners of Morehouse Industries of Los Angeles, California, announce that they have purchased the Cowles Dissolver business of the Cowles Company, Inc., Cayuga, N.Y. The purchase includes the plant facilities, land, buildings, machinery, inventory and equipment.

The Cowles Dissolver is a specialized type of machinery designed to accomplish dissolving of particles of material in solution at exceptionally high speed. The general manager of the Dissolver manufacturing facilities under the new owners will be Horton N. Meyer, Jr., who was formerly associated with the Cowles Company, Inc., for over seven years.

C. E. Lane Retires from Gulf

Mr. C. E. Lane, Assistant Treasurer in charge of Insurance Department of Gulf Oil Corporation and its subsidiary companies, retired December 31, according to an announcement of the company.

Mr. J. A. Edwards has been elected Assistant Treasurer, succeeding Mr. Lane.

A veteran of thirty-nine years of service, Mr. Lane has spent most of that time handling insurance matters for Gulf, and is considered an authority in that field.

He joined Gulf in 1916 as a clerk in the Auditing Section of the Sales Department and was transferred to the Treasury Department shortly before his induction into the U. S. Army Aviation Corps during World War I.

Following his return to Gulf in 1919, Mr. Lane rejoined the Company's Treasury staff and assisted in organizing the Insurance Department. Subsequently he became Office Manager and then Assistant Manager of the department.

He was elected an Assistant Treasurer in 1950 and placed in charge of the Insurance Department and has served in that capacity until the present.

Mr. Edwards joined Gulf in 1950 as Assistant Manager of the Insurance Department and has served in that capacity until his recent election.

Prior to coming with the company, he had extensive executive insurance experience with some of the major companies in the field.

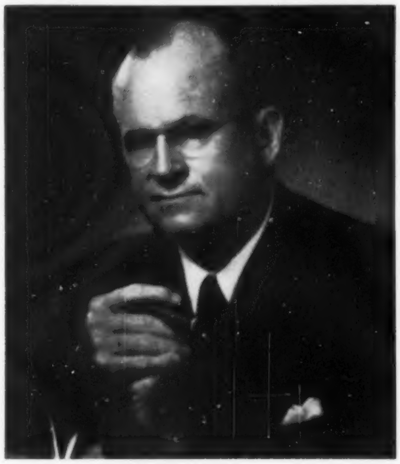
During World War II, Mr. Edwards was Assistant Chief of the U. S. Navy Insurance Department with the rank of Lieutenant Commander.

He will continue to be located in the company's General Office in the Gulf Building, Pittsburgh.

★

Oil moves through the "biggest inch" pipe line at a speed of three and a half miles per hour, or as fast as a man can walk.

To Head Dock Board



WILLIAM H. SAUNDERS, JR.

William H. Saunders, Jr., president and founder of the International Lubricant Corporation, was elected president of the New Orleans Dock Board on January 17th at the board's first meeting of the year. He is one of the three founders of the National Lubricating Grease Institute where he has served as a member of it's board of directors for many years. He is also a past vice president and president of that organization.

Outlining future plans for the Dock Board, Saunders pointed out future expansion of facilities necessary for anticipated trade through the port. He told the board "commerce through the port in 1954 emphasized the need for future expansion . . . the first move in a long range wharf improvement program . . . will probably require expenditures in excess of $10,000,000."

New Orleans is the number two port of the nation and must be maintained with increased facilities to meet the challenge of expanded national trade.

For all we know this may be another pioneering venture for NLGI Director Saunders. Twenty-two years ago he thought the lubricating grease industry urgently needed leadership and direction. He created the NLGI as an answer to that problem. Forceful in the creation of this organization it's expected he will again use the quiet mastery of his own ability to lead by creating a still greater port of New Orleans.

Industry NEWS

G. P. & F. Celebrating Diamond Anniversary

Geuder, Paeschke & Frey Co., Milwaukee, is celebrating its Diamond Anniversary in 1955. Founded in Milwaukee on January 2, 1880, the firm is now 75 years old.

Started as a small "tin shop" for the manufacturing of tin plate cooking and baking utensils, G. P. & F. has grown with the years. More than 1100 persons are now employed in plants in Milwaukee; Sheboygan, Wis.; and Lebanon, Ind.

Today, some of Geuder, Paeschke & Frey's best known products are housewares and dairy utensils, and ironing tables and pad and cover sets. But a glance at one of the firm's earliest catalogs shows that America's needs were quite different 75 years ago. In those days, G. P. & F. was making moulds for home-made candles, tin coffee flasks (the forerunner of the thermos bottle), portable tin bath tubs, camp kettles for the Klondike trade, and torches for political parades.

Rare in American business history is the fact that today, two grandsons of the original founders, August K. Paeschke, President and General Manager, and Frank T. Frey, Executive Vice President, continue in the operation of the company formed by their grandfathers 75 years ago.

Continental Can Announces Service Agreement With Japanese Company

Continental Can Company has signed a service agreement with Toyo Seikan Kaisha, Ltd., of Tokyo, it has been announced by Lowell K. Hanson, general manager of Continental's Overseas Division.

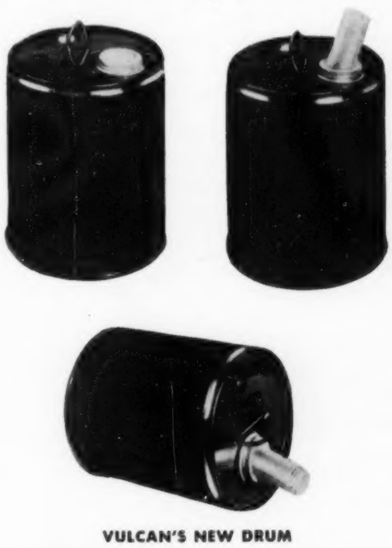
Under terms of the agreement, the Japanese company, represented by M. Yoshikawa, managing director, becomes a licensee to use Continental's machinery, manufacturing processes and technical knowledge in the metal container field, he said.

Toyo Seikan, a manufacturer of open-top and general line cans, has four factories located in Shimizu, Osaka, Tobata and Tokyo.

Vulcan Announces New Drum

Now available from stock in small or large quantities is the new Vulcan one-gallon tight head drum incorporating all the up-to-date features of standard-size containers.

Answering the demand for smaller, easier-to-handle shipping and dispensing containers, this one-gallon drum will be available with either a regular interior coating or a hi-bake lining. The one-gallon drum meets the demand for shipment of products where smaller quantities are required as in agriculture, laboratories or numerous departments within a company—eliminate wasteful refilling which is often-



VULCAN'S NEW DRUM

times dangerous and a fire hazard.

The new drum is a sturdy, standard ICC-17E container, round in shape with welded side seams and double-seamed ends. The top is necked in to provide for convenient stable stacking, and has a carrying handle and recessed 45 mm screw cap—pouring spouts, either plastic or metal, available. The interior of the drum has a non-toxic, chemical resistant hi-bake lining, with additional interior linings for other products supplied upon individual requirements, packed in cartons.

For a sample, and further information, write Vulcan Stamping and Mfg. Co., P. O. Box 161, Bellwood, Illinois.

Spaght Calls for "Brave New Research"

One of man's best hopes for a better future on earth is in "brave new research" to find new sources of energy, according to Monroe E. Spaght, executive vice president of Shell Oil Company. Speaking recently before the Stanford Research Institute in San Francisco, he urged an audience of western business men to support large-scale studies that will improve the efficiency with which present energy sources are used and develop new sources for the future.

The need for scientific advance is urgent, he indicated, because world population, which is growing at an explosive rate, demands enormous new quantities of energy every year. Progress will continue only if enough energy can be supplied to support the growth.

Mr. Spaght said he is confident the energy will be found. Meanwhile, petroleum industry research programs designed to improve the efficiency with which oil is used will make the supply of this fuel last longer and thus allow more time for developing other sources.

The new source of greatest promise for the near future is atomic energy, already being developed for use in generating electricity. Atomic energy will probably be in very general use for peaceful purposes much sooner than many now believe, Mr. Spaght said.

Even greater energy sources may be developed from the fusion (H-bomb) reaction. This source of energy, if it can be controlled for peaceful uses, could supply all the world's needs for centuries.

The greatest source of energy is the sun—three days of sunshine pour on the earth as much energy as could be obtained by burning all the available wood and fossil fuel and consuming all the fissionable materials. With our present knowledge, it is hard to capture and use much solar heat. But future research and technology will doubtless lead to ways of using much more of it.

Among other possible—though still

very remote—goals for research he mentioned:

1. Low resistance conductors permitting wide distribution of electricity from relatively few big atom-powered generating stations.
2. A device, possibly some sort of cell, for converting the energy in petroleum molecules directly to electricity. This would greatly increase the efficiency with which oil is now used.
3. A battery that would provide enough energy to run a car as far charged.

"Given enough progress in scientific investigation, we can be sure of progress in practical results, in the development of new energy sources," he said.

"The outcome will be more than a staving off of trouble. It will be a spreading of productive power, a lifting of much of the distress that has shadowed man all his years on earth, a chance for all men to find life a more comfortable and, perhaps, even a more satisfying experience. This is a lofty goal. But it is outlined in the intensely practical terms of our present situation. We should not consider trying for anything less."

API Booklets Very Popular

Two booklets recently released by the American Petroleum Institute to help service stations boost motor oil sales have proved so popular that the first printing is exhausted, and a second is now on the presses.

Entitled "Know Your Motor Oil" and "How to Sell Motor Oil," the booklets were prepared by the Institute's Marketing Division.

The initial printing of 50,000 copies of each was purchased within three weeks after announcement of their availability, according to A. J. Rumoshosky, Director of the Division of Marketing. He said the second printing calls for another 50,000 of each.

The Marketing Director noted that orders for the booklets came from both large and small oil companies and from many individual dealers and jobbers.

"Know Your Motor Oil" gives the dealer important facts he needs to sell his products confidently and aggressively. This attractively illustrated booklet also helps dealers answer cus-

tomers' questions about motor oil and automotive lubrication.

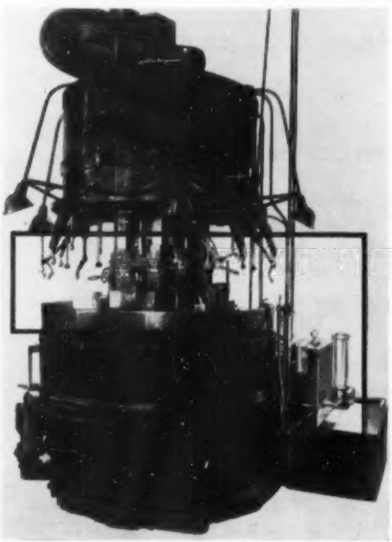
In addition, it explains in easy-to-understand language the importance of proper lubrication and the functions of motor oil additives, as well as the SAE viscosity terms, the API lube service classifications, and the new API crankcase oil drain policy.

"How to Sell Motor Oil," which was designed as a companion piece to "Know Your Motor Oil," describes practical sales techniques that dealers and their employees can use effectively in increasing their ratio of motor oil to gasoline sales. The booklet, which is written from the dealer's point of view, covers such topics as product promotion, personal selling, meeting customer objections, and closing the sale.

Each of the two booklets is available at $20.00 for the first hundred copies, and 15 cents each for additional copies. Quantity discounts are available on bulk orders. The booklets can be obtained from the API's Division of Marketing, 50 West 50th Street, New York 20. Checks or money orders should accompany orders for less than $10.00.

★

Today, the American people account for 62 per cent of the free world's consumption of crude petroleum and petroleum products.



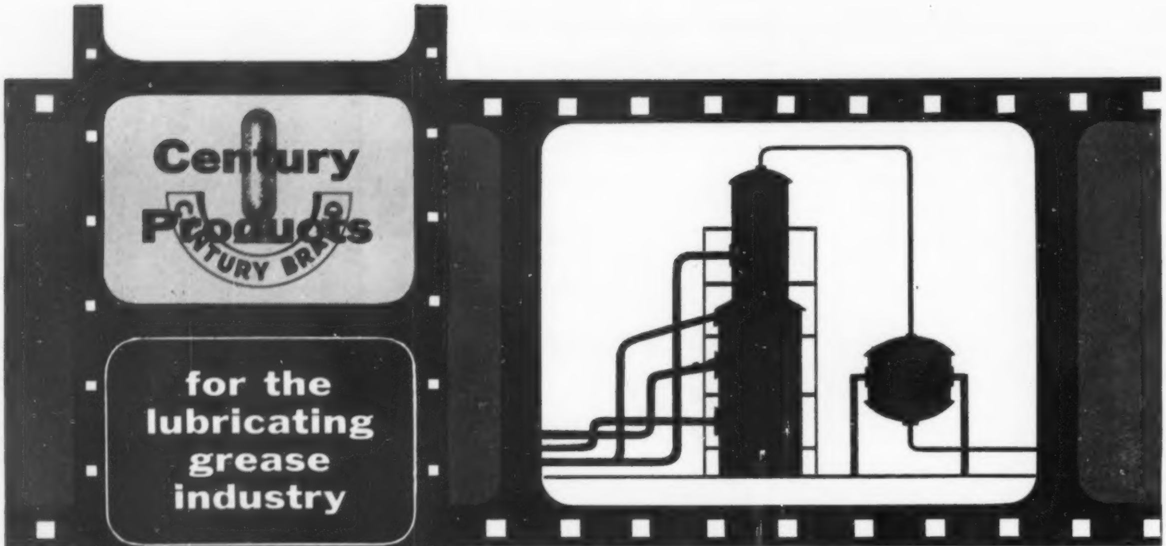
Illustrated, Lincoln Engineering Company Air-Operated Power Drive Centralized System which may be controlled automatically by electrical time switch or mechanical motion of machine.

Foote Lowers Price of Lithium Hydroxide

Foote Mineral Company, leaders in the production of lithium chemicals, announce a substantial reduction in the price of lithium hydroxide monohydrate.

Reductions, covering all price brackets, average 15% and reflect the economies of expanded production at Foote's Sunbright, Va., and Kings Mountain, N. C. plants.

Pictured is Canadian Petrofina, Ltd.'s new catalytic cracking tower now being erected at Montreal.



Have you investigated the outstanding qualities of Cenwax A and Cenwax G in the compounding of lithium greases?

Cenwax A (12-Hydroxystearic Acid) produces grease with exceptional shear stability, good water resistance, and stable greases over wide temperature ranges. Compounding greases at low temperatures as well as quick cooling are desirable features.

Cenwax G (Hydrogenated Castor Oil Glyceride) An excellent glyceride of 12-Hydroxystearic acid where the use of a glyceride is preferred because of processing conditions.

Write for specifications and samples

HARCHEM DIVISION

Wallace & Tiernan, Inc.

Successors to W. C. Hardesty Co. Inc.

25 MAIN STREET, BELLEVILLE, NEW JERSEY

Factory: Dover, Ohio. In Canada: W. C. Hardesty Co. of Canada Ltd. Toronto

Interesting News

United States agriculture uses 16.6 per cent of all petroleum products in this country. No other single segment of American industry uses as great a proportion of the nation's petroleum production.

★

About 80 per cent of the nation's rural roads, including federal and state highways, are surfaced with petroleum-derived asphalt.

New Precision Mil-Shell Roll Grease Tester

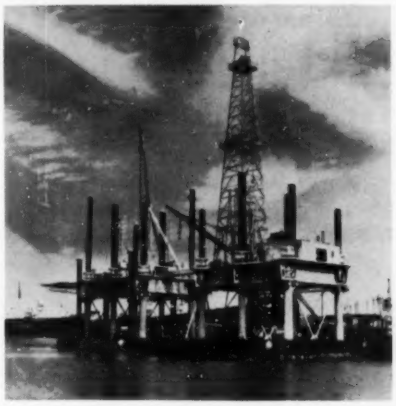
Precision Scientific Company has redesigned the Roll Tester for Greases, providing many new features, in order to conform with both the specifications of the Shell Rolling Stability Test and Amendment 2, Military Specification MIL-G-10924 (ORD).

Some of the new features are: temperature control from room to 175° F., with an accuracy of approximately $\mp$ 1° F.; interchangeable sprockets for the drive mechanism, providing for speeds of 10 rpm and 160 rpm; an easily removed test cylinder floating on two pairs of rubber rollers, one of which is rotated by the drive mechanism; and a recess-mounted, easy-to-read dial thermometer.

The Mil-Shell Roll Grease Tester is used to measure the tendency of lubricating greases to liquefy in service. It is applicable for lubricant testing laboratories of both producers and users of lubricating greases, including many establishments of the armed forces.

Illustrated literature will be sent on request.

ROLL TESTER



Latest of the mobile off-shore drilling units is "Mr. Gus," designed to operate in hitherto water depths of as much as 100 feet. The drilling platform (right, with derrick) and the service platform (left, with helicopter port, space for supplies and quarters for 30-man crew) are towed separately to the drilling site. There the 4-foot-diameter corner piles are forced into the ocean floor by hydraulic jacks. The lower hulls are then water-filled and sunk, helping the piling support the upper hulls and increasing the unit's "anchored" stability and seaworthiness. The two platforms are then connected by a narrow catwalk of steel.

Lubricant Measuring Valves

Hydraulically-operated valves for dispensing predetermined, measured quantities of lubricant are now available with any discharge output range desired. Valves incorporate an adjusting screw at each end of the measuring chamber for controlling the exact quantity of lubricant output desired, and mounting brackets to facilitate installation.

These measuring valves are designed for use with a four-way Control Valve, which is supplied with lubricant from a power-operated pump. The system provides means for automatically applying metered quantities of oil or grease to gear cases, small transmissions, bearings, electric motors, etc., in assembly line operations. For specifications and prices, write Lincoln engineering Company, Industrial Division, 5702-30 Natural Bridge Avenue, St. Louis 20, Missouri.

★

U. S. seismograph crews each year lug themselves and their equipment over a distance 17 times greater than the circumference of the earth.

New Road Testing Method Shown By Shell Oil

A new method of testing the load carrying capacity of roads, which is expected to lead to better design and engineering of highways, has been demonstrated by Shell Oil Company at the U. S. Bureau of Public Roads' Langley Research Station, Virginia.

Developed by the Shell organization over a period of ten years, it is a method of dynamic testing of roads which simulates the jarring effects of actual traffic on asphaltic construction and measures these effects in engineering units.

It has the advantages over previous methods of being non-destructive, requiring no samples or laboratory work and providing immediate, on-the-spot answers. It can measure movements in pavement as small as one ten-thousandth of an inch.

Attending the demonstration were representatives of the Bureau of Public Roads, Corps of Engineers, U. S. Navy Bureau of Yards and Docks, Civil Aeronautics Administration, Highway Research Board, members of state highway agencies, and engineers and others in private industry connected with road building and maintenance.

The method uses a mobile machine containing eccentrically weighted wheels which impart to the pavement through a stationary vertical shaft and base plate the same effects as passing automobiles and trucks. The effects are measured and recorded on electronic devices.

This method of testing shows how much the pavement is pushed down by a vehicle, how much of a bend there is in the top surface, how far load vibrations travel through the pavement, and its fatigue characteristics.

ROAD TESTING

Large Catalytic Cracking Tower Going Up

The tallest Houdriflow catalytic cracking tower ever built in Canada is now being erected at the Canadian Petrofina, Ltd. refinery being constructed in Montreal, it has been announced by The Lummus Company, Canada, Ltd., general contractors for the plant.

Canadian Vickers, Ltd. is building and erecting the Houdriflow Unit for Lummus. When completed, it will be 285 feet high with a maximum diameter of 24 feet. The tower is being shop-fabricated in sixteen sections and will be trucked to the plant site.

To lift the sections in place, the highest guy derrick ever used on this continent has been erected at Pointe Aux Trembles. The derrick has an overall height of 425 feet. The mast, 215 feet high, and boom, pivot on a tower of open girder construction 210 feet high and 84 inches square.

As now assembled, the derrick can lift 80 tons, a height of 400 feet. Heaviest lift on this job is 67 tons.

★

A modern "supertanker" can carry enough gasoline to fly a Stratocruiser around the world 301 times.

Shell Development Expands

Shell Development Company, research affiliate of Shell Oil, will expand its Emeryville, Calif., laboratory and office facilities by 50 per cent through the purchase of Western Electric and Pacific Telephone and Telegraph properties. Shell Development has signed an agreement to buy three buildings and 4.3 acres of land adjoining its present site. The deal has been approved by the California Public Utilities Commission.

Conversion of the property for research is expected to begin about April 1, 1955, and will probably go on for several years.

The new addition, needed to handle growing requirements of research and development in the oil and chemical industries, is Shell Development's fifth major expansion program since it was formed in 1928. Its staff has grown from 35 to 1300 and its budget has risen 40 fold to more than $10 million a year.

★

Many of the 89 million new automobile and truck tires needed to keep America rolling next year will be made from oil-derived synthetic rubber.

FUTURE MEETINGS of the Industry

MARCH, 1955

15-17 Ohio Petroleum Marketers Association (spring convention and trade exposition), Deshler-Hilton Hotel, Columbus, Ohio.

17-19 Texas Oil Jobbers Assn. (annual convention and trade exposition), Gunter Hotel, San Antonio, Texas

24 National Industrial Conference Board, Shamrock Hotel, Houston, Texas

APRIL, 1955

11-15 Greater New York Safety Council (annual convention and exposition), Statler Hotel, New York, N.Y.

13-15 American Society of Lubrication Engineers (tenth annual meeting and lubrication exhibit), Hotel Sherman, Chicago, Illinois.

MAY, 1955

9-12 American Petroleum Institute (Division of Refining, midyear meeting), Jefferson Hotel, St. Louis, Mo.

16-18 American Petroleum Institute (Division of Marketing, Lubrication Committee), The Greenbrier, White Sulphur Springs, W. Va.

16-18 American Petroleum Institute (Division of Transportation, Products Pipe Line Conference), Edgewater Beach Hotel, Chicago, Ill.

19-20 National Industrial Conference Board, Waldorf-Astoria Hotel, New York, N. Y.

23-25 American Petroleum Institute (Division of Marketing, midyear meeting), Chase and Park Plaza Hotels, St. Louis, Mo.

JUNE, 1955

6-15 Fourth World Petroleum Congress, Rome, Italy.

12-17 SAE Golden Anniversary Summer Meeting, Chalfonte Haddon Hall, Atlantic City, N. J.

26 to July 1 American Society for Testing Materials (annual meeting), Chalfonte-Haddon Hall, Atlantic City, N. J.

OCTOBER, 1955

23-25 National Assn. of Oil Equipment Jobbers (4th annual meeting), Hotel President, Kansas City, Mo.

31 to Nov. 2 NLGI ANNUAL MEETING, EDGEWATER BEACH HOTEL, CHICAGO, ILL.

NOVEMBER, 1955

14-17 American Petroleum Institute (35th annual meeting), San Francisco. Calif.

JUNE, 1956

17-22 American Society for Testing Materials (annual meeting), Chalfonte-Haddon Hall, Atlantic City, N. J.

★

Diesel fuel demand has increased at a rate of about three times that of gasoline.

Photo by Underwood & Underwood

Machines instead of muscles!

Imagine the strip-pit coal mining operation, shown above, *without* the giant shovel . . . *with only* men and hand tools. You would have to measure productive capacity in pounds instead of tons.

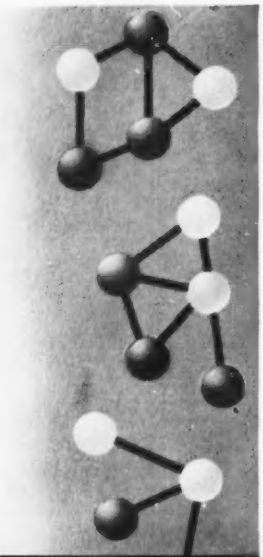
But even men with hand tools could produce more than the heaviest equipment . . . if that equipment is broken down because of faulty lubrication. Only the *right* lubricant provides the "muscles" needed to keep bearing surfaces from grinding destruction.

We here at Battenfeld make available to you our 35 years of experience in compounding lubricants for *specific* job requirements. Bat's greases are compounded products of many types, each with its own purpose. Our lubricants are literally *millions of units in protective action!* . . . highly complex units whose molecular structure varies widely with the job each grease must do.

Battenfeld is research and production headquarters for lubricating greases sold under the trade names of the nation's most famous marketers and jobbers.

Your inquiry is cordially invited.

"Never shall the surfaces meet!" says Batlas*, the Battenfeld "strong man" . . . even though pressures reach 90,000 lbs. and tolerances are as close as 1/10,000 of an inch. (**Trade Mark Registration applied for.*)



Molecular structure varies widely between scientifically compounded Battenfeld greases—according to the condition under which bearing surfaces must be lubricated.

BATTENFELD

international headquarters for LUBRICATING GREASES produced for famous marketers

"Business Is Ingreasing"

* TRADEMARK

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Reduce Manufacturing Costs
Increase Manufacturing Capacity

With a Modern STRATCO Grease Plant

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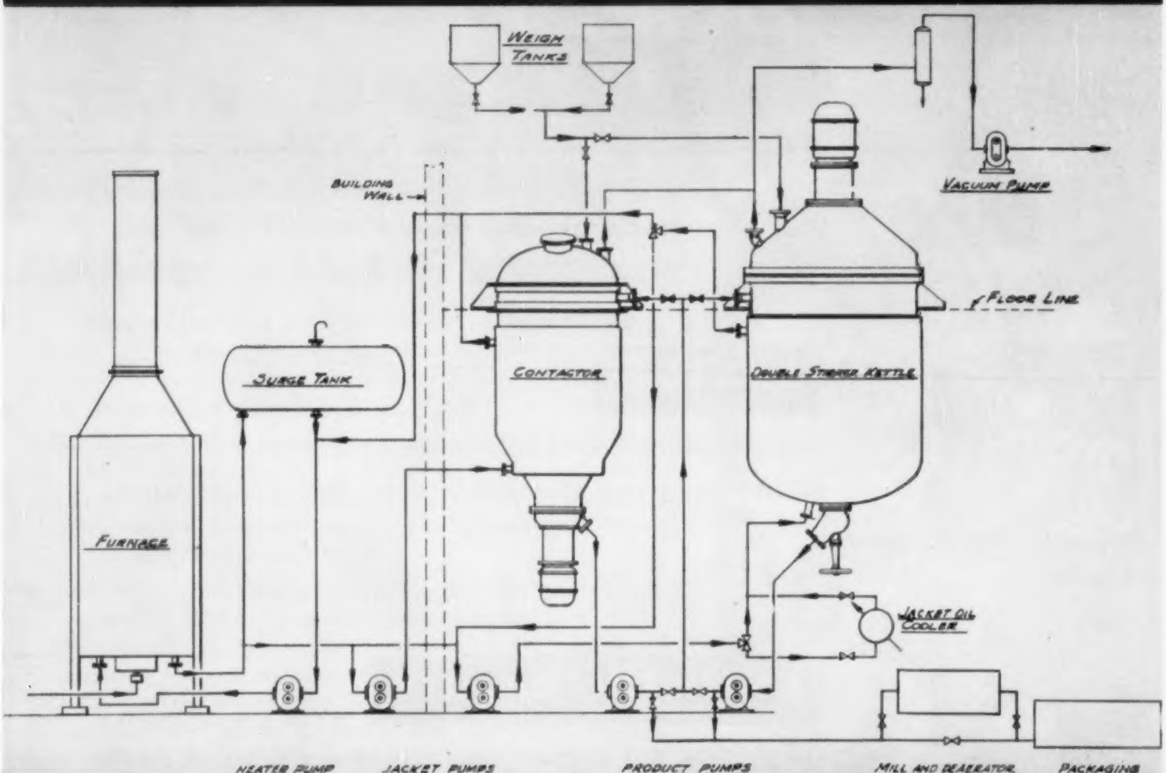

Featuring the Famous Stratco Contactor

A Stratco grease plant installation offers you these distinct advantages . . . comparative simplicity, a higher level of efficiency and greater economy.

The basic reason for these advantages is the Stratco contactor. This highly efficient mixer replaces other types of equipment and simplifies plant layout. It provides continuous or batch mixing with very short time cycles. It makes possible the production of more uniform greases with less soap and with simplified laboratory control.

Thus you can either increase production or reduce man hours of operation . . . with a Stratco installation. Write for details.

STRATFORD ENGINEERING Corporation

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